1955). The systematics and anatomy of the Florida species of *Drymaeus* are summarized by Pilsbry (1946, p. 21) and Breure and Eskens (1981).

On 26 September 1982, during a heavy rainstorm, four specimens from a small colony of *D. multilineatus* were seen descending two trees (*Bursera simaruba*) on which they had been seen feeding earlier at the study site on Stock Island. The snails burrowed into the upper layers of the leaf mold immediately at the base of the trees once they had reached the ground. Burrowing continued until all but the extreme tip of the shells were covered loosely by leaf fragments, a depth of approximately 2 cm.

Ovulation occurred over a period ranging from 18 to 22 hours subsequent to burrowing. The eggs were small and round with a maximum diameter of 2 mm. They were yellow-white and moderately hard but not calcareous and were deposited in a slightly sticky mass of 40-99 eggs.

Two weeks later, on 9 October 1982, the nests were re-examined. It was found that all of the egg masses had shriveled up due to dessication. Similar shriveled egg masses were found throughout the study area, indicating that this may be a major source of mortality.

This work was supported by funding from the Division of Sponsored Research, University of Florida (DSR Seed Grant A-1-26) and the U. S. Fish and Wildlife Service (Contract No. 85910-0759), extended to Fred G. Thompson, Florida State Museum.

LITERATURE CITED

Breure, A. S. H. and A. A. C. Eskens. 1981. Notes on and descriptions of Bulimulidae (Mollusca, Gastropoda), II. *Zoologische Verhandlingen*, Leiden. No. **186**(1981):1–111, pls. 1-8.

Muma, M. H. 1955. Observations on the biology of the citrus tree snail. *The Citrus Industry* **36**(1):6–9 & 21.

Pilsbry, H. A. 1946. Land Mollusca of North America (north of Mexico). *Acad. Nat. Sci. Philad. Monogr.* No. 3(2(1)): i-vi, 1–520. [pp. 21–29].

A NEW SINISTRAL TURRID FROM BRAZIL (GASTROPODA: TURRIDAE)

Donn L. Tippett
10281 Gainsborough Rd.
Potomac, Maryland 20854

ABSTRACT

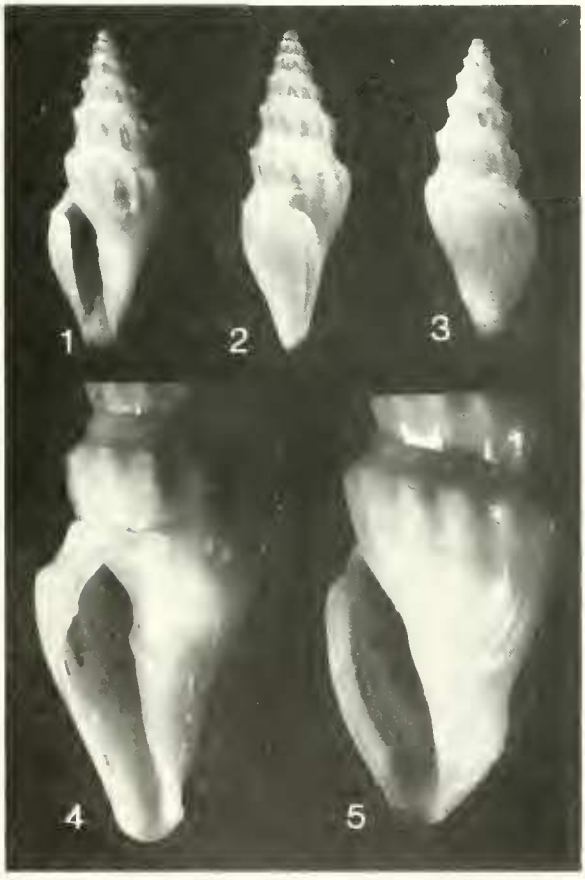
A new turrid species, Borsonia brasiliana, *characterized by sinistral coiling is described and figured. A columellar plait and other features places it in the subfamily Borsoniinae and the genus* Borsonia. *The sinistral turrids are reviewed briefly.*

The discovery of a lot consisting of 144 specimens of an undescribed and unusual turrid in the collection of Recent mollusks of the U. S. National Museum of Natural History, Washington, D. C., warrants the establishment of a new species. This is by virtue of its distinctive features including sinistral coiling, the presence of a columellar plait, and other aspects of shell morphology. The proposed taxon, *Borsonia brasiliana,* is based on conchological characters as no animal material was available. A few dried animals were present, but attempts to recover

radular teeth by dissolving in KOH were unsuccessful.

Subfamily: **Borsoniinae** Bellardi, 1875
Genus: ***Borsonia*** Bellardi, 1839
Borsonia brasiliana *new species*
(Figs. 1–5)

Description: Shell small (largest specimen 12.9 mm), sinistrally coiled, biconic fusiform, spire with a somewhat blunt apex, body whorl large and tapering gently to a moderately elongate open, weakly notched anterior canal. A small umbilical chink and a rounded anterior siphonal fasciole of variable strength are usually present in larger specimens. Columella slightly twisted to the right and bearing a narrow, moderately elevated plait just above the center. The plait tends to be placed well back in the aperture but is usually easily visible. Occasionally it can be seen to terminate or fade within the recess of the aperture. It is occasionally weak or, rarely, rudimentary. The plait can usually be seen on earlier whorls when breaks or drilled holes permit viewing. A suggestion of a second, broader, fold below the plait is present in about 10% of specimens. The columellar lip shows a thin glaze of callus, margined below in large specimens. Protoconch of 2 to 2½ smooth whorls with a slightly immersed and somewhat laterally placed tip. Protoconch usually preserved. Adult sculpture marked by the appearance of small axial ribbing. Post-nuclear whorls 5 to 6, sharply angled just above mid-whorl by the ends of the axial ribs, and with a concave sulcus extending to the preceding suture. Suture minutely channeled producing the impression of a spiral subsutural thread. Sculpture of oblique axial ribs, 12 to 14 on the penultimate whorl. These are regularly spaced, about the same width of that of the interspaces, broader at the shoulder where they are angled and often finely noded or even slightly cusped. Although rather constant, the axials are reduced in strength occasionally, approaching peripheral nodulation only. This is never to the degree seen in *Borsonia ceroplasta* or *B. silicea* however. In some large specimens the axials become nearly obsolete on the last whorl. Posterior sinus occupying the whole of the shoulder slope, moderately deep, U-shaped. Lip thin, fragile, usually broken. No "stromboid notch" or varix. Color uniformly milky white, glistening and somewhat translucent when fresh. A few specimens contained dried animals retracted too deeply within the shell to observe for an operculum. Two specimens were sacrificed to attempt recovery of radular teeth. No operculum was identified on the broken pieces of animal thus obtained.



FIGS. 1–5. Borsonia brasiliana *new species.* 1, 2, 3, *Anterior, lateral and posterior views of Holotype, USNM 810567, 11.9 mm length, 4.3 mm width.* 4, *Specimen with lip broken back showing columellar plait.* 5, *Specimen with enlarged siphonal fasciole. (Photos courtesy Smithsonian Institution, V. Krantz).*

Type locality: 200 miles north of Sao Luis, Brasil, on the edge of the continental shelf at 150 fathoms; lat. 00°18'N, long. 004°17'W. R/V *Oregon,* station 4226, Mar. 9, 1963, in one dredge haul using a six foot dredge. No record of substrate.

Types: Holotype: USNM 810567, 11.9 mm

TABLE 1. *Ratios of major shell dimensions in percentages. Based on measurements of 20 largest, intact (presumably adult) specimens. Range of measurements: Total length 10.9–12.9 mm; Maximum width 4.0–5.1 mm; Body whorl length 6.2–8.5 mm; Length aperture plus canal 5.0–6.0 mm. Spire angle 27°–35°, mean 30°, standard deviation 2.1°.*

	Max. width to total length	*Body whorl to total length*	*Apert. plus canal to total length*
Range	34-40	55-69	42-52
Mean	36	64	46
Standard deviation	1.7	3.9	3.2

length, 4.3 mm width. Paratypes: USNM 818743 (119 specimens). Two additional paratypes deposited at each of the following institutions: Academy of Natural Sciences of Philadelphia, Pennsylvania; American Museum of Natural History, New York; Auckland Institute and Museum, New Zealand; British Museum (Natural History), London; California Academy of Sciences, San Francisco; Delaware Museum of Natural History, Greenville, Delaware; Los Angeles County Museum, Los Angeles; Museum of Comparative Zoology, Cambridge, Massachusetts; Museum National d'Histoire Naturelle, Paris; Zoological Museum, Copenhagen; and the Museu Oceanografico, Rio Grande, Brasil.

Remarks: The museum lot apparently represents sampling of a homogeneous population. There is little variation among individuals. Range of variation of major dimensions is noted in Table 1. As can be seen, the greatest variability is in the ratio of body whorl length to total length, although this is not evident simply by inspection. The most obvious variation, besides that described for the axial ribs, is in the strength of the siphonal fasciole. This is well marked in perhaps a dozen large specimens. It would appear to be a function of maturity, possibly a gerontic phenomenon, however other individuals of equal size do not show equivalent enlargement. A few of the specimens with fasciolar enlargement show a less well-developed plait and a slightly "fatter" shell outline, but there is no clear cut correlation between any grouping of shell characters suggesting distinct forms. About 60% of specimens are drilled, the hole being typical of that made by naticids.

Discussion

Borsonia brasiliana is considered a member of the subfamily Borsoniinae on the basis of the presence of a columellar plait, which is the primary feature of the group with respect shell morphology. Placement in the genus *Borsonia* is based on similarity of shell structure to other members of the genus, all dextral, especially *B. prima* from the Italian Miocene. (Bellardi, 1839, p. 30). There are adequate specific differences to warrant the conclusion that *Borsonia brasiliana* is a distinct species and not a sinistral mutation of another. Similarity to *Borsonia prima* is evident on comparison with that species. (Bellardi, 1847, pl. 4, fig. 13; Powell, 1966, pl. 8, figs. 9, 10). The two are reasonable "mirror images", however *Borsonia prima* has spiral sculpture, less well-developed axials, and is larger. A further modification of the axial ribbing in their reduction to peripheral nodules is seen in the Recent species of the genus from the Western Atlantic: Watson's *Borsonia ceroplasta* from off Puerto Rico, and *B. silicea* of Brazilian waters. (Watson, 1886, pl. 18, fig. 2, and pl. 21, fig. 8 respectively). Other differences are also present. Interestingly, a species widely separated geographically, *Borsonia jaffa*, is the only other form lacking spiral sculpture. (Cotton, 1947, p. 14 and accompanying plate). *Borsonia jaffa* shows peripheral nodules only and has an elongated anterior canal.

A new sinistral form invites comparison with the other known sinistral turrids, although there is little similarity besides left-handed coiling. None are borsoniids. The genus *Antiplanes* Dall (1902, p. 513), a Recent and fossil group from the American west coast, has the sinus nearly on the periphery, no axial ribs, and a very different shell outline. It is a member of the subfamily Turrinae according to Powell (1966, p. 52). The genus contains a number of species

names many of which are undoubtedly synonyms and needs review. The gemmate *Sinistrella* Meyer (1887, p. 18), with two species, from the S. E. United States Eocene is also turrinine, having the sinus on the periphery. A left-handed species known only as *Pleurotoma sinistralis* (Petit, 1839, pl. 1) from the Senegal coast has a rather pupoid shell outline, the sinus near the periphery, and no axials. It was figured by Reeve (1843, pl. 10, sp. 81) and Tryon repeated Reeve's illustration (1884, pl. 13, fig. 64). The figure is poor but nevertheless differs from Petit's in showing what appears to be a beaded subsutural cord. Perhaps two species are involved. The species should be investigated. Reeve's illustration of Hind's *Conopleura striata* (1846, pl. 36, sp. 330a), unnecessarily renamed *partita*, is sinistral but in error. The species is dextral. Reeve makes no mention of the shell being sinistral and his other figure (sp. 330b) is dextral. Tryon (1884, pl. 8, fig. 7) continues the error, commenting that "one of Reeve's figures shows a reversed shell, a rarity in this genus". He recognizes Reeve's name as unnecessary.

ACKNOWLEDGMENTS

The author wishes to thank the NMNH for the opportunity of working with its magnificent collection, and particularly to express his appreciation to Dr. Joseph Rosewater for his kind support and assistance. Virginia O. Maes was most helpful in her review and critique of the paper. Also Drs. A. W. Baden Powell and R. Tucker Abbott made valuable suggestions.

LITERATURE CITED

Bellardi, L. 1839. Bull. Soc. Geol. de France, vol. 10, 517 pp.

_____ 1847. Monografia delle Pleurotome Fossili del Piemonte. Mem. Roy. Accad. Sci. di Torino, 2nd ser., **9**:3–122, 4 pls.

Cotton, B. C. 1947. Some Southern Australian Turridae. *S. Australian Nat.* **24**:13–16, 1 pl.

Dall, W. H. 1902. Illustrations and Descriptions of New, Unfigured, or Imperfectly Known Shells, Chiefly American, in the U. S. National Museum. *Proc. USNM* **24**(no. 1264):499–566, pls. 27-40.

Meyer, O. 1887. Beitrag zur Kenntnis der Fauna des Alttertiars von Mississippie und Alabama. *Ber. Senck. natur. Gesell.*, 22 pp., 2 pls.

Petit de la Saussaye, S. 1839. *Guerin's Mag. de Zool.*, 2nd ser., vol. 1, pl. 1, accompanying text.

Reeve, L. A. 1843–1846. *Conchologia Iconica*, vol. 1, Pleurotoma, 40 pls., accompanying text. London.

Tryon, G. W. 1884. *Manual of Conchology*, parts 23, 24, pp. 151–413, 34 pls. Philadelphia.

Watson, R. B. 1886. *Challenger Reports*, Scaphopoda and Gasteropoda, pt. 42, vol. 15, 756 pp., 53 pls.

A NEW SPECIES OF *CATINELLA* (SUCCINEIDAE): PULMONATA FROM SOUTHERN MICHIGAN

Dorothea S. Franzen
Illinois Wesleyan University
Bloomington, Illinois 61702

ABSTRACT

A new species of Catinella *(Succineidae) with its shell characteristics, reproductive organs, pigmentation and habitat is described. It is known only from the type locality, Long Lake, Cass County, Michigan.*

In the course of field studies on succineid gastropods in the midwestern states I found a small, slender, hitherto undescribed species of *Catinella*.